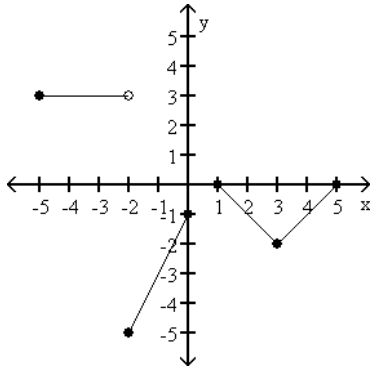
Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine the intervals on which the function is increasing, decreasing, and constant.

1) 1) _____



A) Increasing on (-1, 0) and (3, 5); Decreasing on (0, 3); Constant on (-5, -3)
B) Increasing on (1, 3); Decreasing on (-2, 0) and (3, 5); Constant on (2, 5)
C) Increasing on (-2, 0) and (3, 5); Decreasing on (1, 3); Constant on (-5, -2)
D) Increasing on (-2, 0) and (3, 4); Decreasing on (-5, -2) and (1, 3)

Use a graphing calculator to graph the function. Find any relative maxima or minima.

2) $f(x) = -1.3x^4 + 23.4x^2 - 11.9$ 2) _____

A) Relative maximum of -12.3 at x = 0; Relative minima of 94 at x = -3 and 93.4 at x = 3
B) Relative minimum of -11.9 at x = 0; Relative maxima of 93.4 at x = -3 and 93.4 at x = 3
C) Relative minima of -12.1 at x = 0 and 92.9 at x = 3 ; Relative maximum of 92.9 at x = -3
D) Relative minimum of -12.1 at x = 0; Relative maxima of 93.8 at x = -3.2 and 93.8 at x = 3.2

Use a graphing calculator to graph the function. Find the intervals on which the function is increasing or decreasing.

3) $f(x) = \dfrac{10x}{x^2 + 1}$ 3) _____

A) Increasing on $(-\infty, -2)$ and $(0, \infty)$; Decreasing on (-2, 0)
B) Decreasing on $(-\infty, \infty)$
C) Decreasing on $(-\infty, -1.5)$ and $(1.5, \infty)$; Increasing on (-1.5, 1.5)
D) Decreasing on $(-\infty, -1)$ and $(1, \infty)$; Increasing on (-1, 1)

Solve.

4) Elissa wants to set up a rectangular dog run in her backyard. She has 42 feet of fencing to work with and wants to use it all. If the dog run is to be x feet long, express the area of the dog run as a function of x. 4) _____

A) $A(x) = 20x - x^2$ B) $A(x) = 22x - x^2$ C) $A(x) = 23x^2 - x$ D) $A(x) = 21x - x^2$

5) From a 15-inch by 15-inch piece of metal, squares are cut out of the four corners so that the sides can then be folded up to make a box. Let x represent the length of the sides of the squares, in inches, that are cut out. Express the volume of the box as a function of x. Graph the function and from the graph determine the value of x, to the nearest tenth of an inch, that will yield the maximum volume. 5) _____

A) 3.1 inches B) 2.3 inches C) 2.5 inches D) 2.8 inches

For the piecewise function, find the specified function value.

6) $f(x) = \begin{cases} x - 5, & \text{for } x < 2, \\ 6 - x, & \text{for } x \geq 2 \end{cases}$ 6) _____

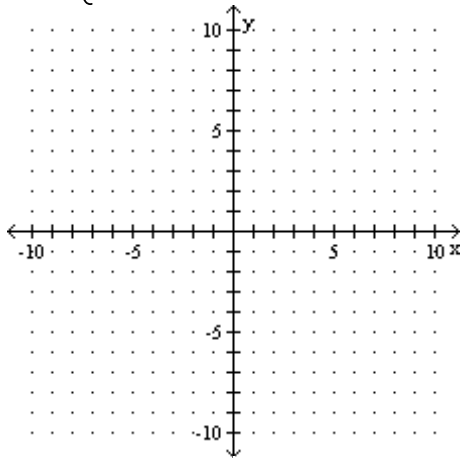
f(0)

A) 4 B) -5 C) -3 D) 6

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Graph the function.

7) $f(x) = \begin{cases} 1 - x, & \text{for } x \leq 2, \\ 1 + 2x, & \text{for } x > 2 \end{cases}$ 7) _____



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

For the pair of functions, find the indicated sum, difference, product, or quotient.

8) $f(x) = x - 3,\ g(x) = -3x^2 + 15x - 1$ 8) _____

Find (fg)(2).

A) -65 B) 85 C) -33 D) -17

9) $f(x) = x + 6,\ g(x) = x - 1$ 9) _____

Find (f + g)(-3).

A) -1 B) 1 C) -11 D) -13

10) $f(x) = 16 - x^2;\ g(x) = 4 - x$ 10) _____

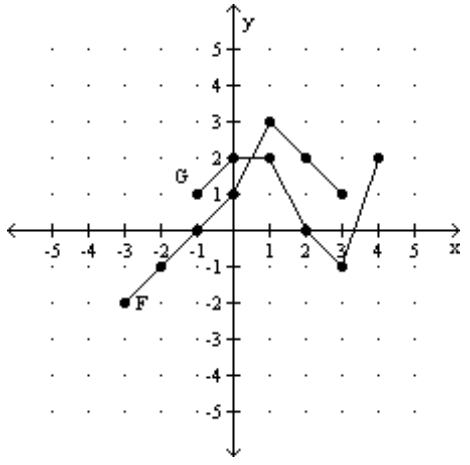
Find (f + g)(x).

A) $-x^2 + x + 12$ B) $x^3 - 4x^2 - 16x + 64$

C) $4 + x$ D) $-x^2 - x + 20$

Consider the functions F and G as shown in the graph. Provide an appropriate response.

11) Find the domain of F + G. 11) _____



A) [-3,4] B) [-1,3] C) [-1,4] D) [-3,3]

For the pair of functions, find the indicated domain.

12) $f(x) = x^2 - 4$, $g(x) = 2x + 3$ 12) _____

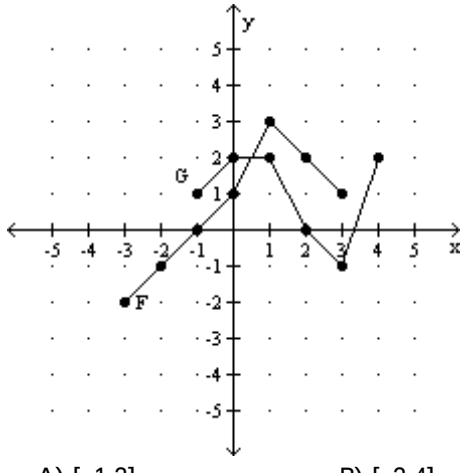
Find the domain of f/g.

A) $\left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)$ B) $(-2, 2)$

C) $(-\infty, \infty)$ D) $\left[-\frac{3}{2}, \infty\right)$

Consider the functions F and G as shown in the graph. Provide an appropriate response.

13) Find the domain of F/G. 13) _____



A) [-1,3] B) [-3,4] C) [-1,2) ∪ (2,3] D) [-3,-1) ∪ (-1,4)

For the function f, construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

14) $f(x) = 3x + 7$ 14) _____

A) $3 + \frac{6(x+7)}{h}$ B) $3 + \frac{14}{h}$ C) 3 D) 0

Find the requested function value.

15) $f(x) = -6x + 3,\ g(x) = -6x^2 + 7x + 5$ 15) _____

Find $(g \circ f)(-7)$.

A) 2031 B) 15 C) 50 D) -11,830

For the pair of functions, find the indicated composition.

16) $f(x) = \frac{3}{x - 5},\ g(x) = \frac{8}{7x}$ 16) _____

Find $(f \circ g)(x)$.

A) $\frac{21x}{8 - 35x}$ B) $\frac{3x}{8 - 35x}$ C) $\frac{8x - 40}{21x}$ D) $\frac{21x}{8 + 35x}$

For the pair of functions, find the indicated domain.

17) $f(x) = 2x - 5,\ g(x) = \sqrt{x + 3}$ 17) _____

Find the domain of $f \circ g$.

A) $[-3, \infty)$ B) $(-3, 3)$ C) $[3, \infty)$ D) $[0, \infty)$

Determine algebraically whether the function is even, odd, or neither even nor odd.

18) $f(x) = 9x^5 - 3x^3$ 18) _____

A) Even B) Odd C) Neither

Answer the question.

19) How can the graph of $f(x) = \frac{1}{2}(x + 7)^2 - 11$ be obtained from the graph of $y = x^2$? 19) _____

A) Shift it horizontally 7 units to the right. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 11 units down.

B) Shift it horizontally 7 units to the right. Stretch it vertically by a factor of 2. Shift it 11 units up.

C) Shift it horizontally 7 units to the left. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 11 units down.

D) Shift it horizontally 7 units to the left. Shrink it vertically by a factor of 2. Shift it 11 units down.